CLAIMS

1. A method for producing a microbattery comprising:

providing a conductive substrate;

forming a thin film cathodic layer on at least one surface of said conductive substrate;

subsequently forming a thin film electrolyte layer over said cathodic layer; and

subsequently forming a thin film anodic layer over said electrolyte layer.

2. A method according to claim 1 and wherein said forming a cathodic layer comprises electrochemically forming said cathodic layer.

3. A method according to claim 1 and wherein said cathodic layer comprises at least one material selected from the group consisting of sulfides of a transition metal, oxides of a transition metal and mixtures of said sulfides and said oxides.

4. A method according to claim 1 and wherein said providing comprises:

providing a non-conductive substrate; and

forming a conductive layer on at least one surface of said non-conductive substrate.

5. A method according to claim 4 and wherein said forming a conductive layer comprises electrolessly depositing a conductive material on said surface of said non-conductive substrate.

6. A method according to claim 5 and wherein said conductive material comprises at least one material selected from the group consisting of Cu, Ni, Co, Fe, Au, Ag, Pd, Pt and their alloys.

7. A method according to claim 1 and also comprising:

providing a plurality of cavities in said substrate, said cavities having an arbitrary shape and having an aspect ratio greater than 1; and

depositing said cathodic layer, said electrolyte layer and said anodic layer between said cavities and throughout the inner surfaces of said cavities.

8. A method according to claim 7 and wherein said cathodic layer, said electrolyte layer and said anodic layer are continuous.

9. A method according to claim 7 and wherein said cavities have an aspect ratio of between 2 to about 50.

10. A method according to claim 7 and wherein said cavities have a cylindrical geometry.

11. A method according to claim 1 and wherein said substrate comprises at least one material selected from the group consisting of glass, alumina, semiconductor materials, ceramic materials, organic polymers, inorganic polymers and glass-epoxy composites.

12. A method according to claim 1 and wherein said substrate comprises silicon.

13. A method according to claim 1 and wherein said cathodic layer comprises at least one material selected from the group consisting of Cu_2S, MoS_2, Co_xS_y where x = 1-4 and y=1-10, Co_mO_n where m=1-2 and n=1-3, WS_2, and mixtures thereof.

14. A method for producing a thin film cathode comprising:

providing a conductive substrate; and

electrochemically forming a thin film cathodic layer on at least one surface of said conductive substrate.

15. A method according to claim 14 and wherein said cathodic layer comprises at least one material selected from the group consisting of sulfides of a transition metal, oxides of a transition metal and mixtures of said sulfides and said oxides.

16. A method according to claim 14 and wherein said providing comprises:

providing a non-conductive substrate; and

forming a conductive layer on at least one surface of said non-conductive substrate.

17. A method according to claim 16 and wherein said forming a conductive layer comprises electrolessly depositing a conductive material on said surface of said non-conductive substrate.

18. A method according to claim 17 and wherein said conductive material comprises at least one material selected from the group consisting of Cu, Ni, Co, Fe, Au, Ag, Pd, Pt and their alloys.

19. A method according to claim 14 and also comprising:

providing a plurality of cavities in said substrate, said cavities having an arbitrary shape and having an aspect ratio greater than 1; and

depositing said cathodic layer between said cavities and throughout the inner surfaces of said cavities.

20. A method according to claim 19 and wherein said cathodic layer is continuous.

21. A method according to claim 19, wherein said cavities have an aspect ratio of between 2 to about 50.

22. A method according to claim 19, wherein said cavities have a cylindrical geometry.

23. A method according to claim 14 wherein said substrate comprises at least one material selected from the group consisting of glass, alumina, semiconductor materials, ceramic materials, organic polymers, inorganic polymers and glass-epoxy composites.

24. A method according to claim 14, wherein said substrate comprises silicon.

25. A method according to claim 14, wherein said cathodic layer comprises at least one material selected from the group consisting of Cu_2S, MoS_2, Co_xS_y where x = 1-4 and y=1-10, Co_mO_n where m=1-2 and n=1-3, WS_2, and mixtures thereof.

26. A microbattery comprising:

a conductive substrate;

a thin film cathodic layer formed on at least one surface of said conductive substrate;

a thin film electrolyte layer formed over said cathodic layer; and

a thin film anodic layer formed over said electrolyte layer.

27. A microbattery according to claim 26 and wherein said cathodic layer comprises an electrochemically formed cathodic layer.

28. A microbattery according to claim 26 and wherein said cathodic layer comprises at least one material selected from the group consisting of sulfides of a transition metal, oxides of a transition metal and mixtures of said sulfides and said oxides.

29. A microbattery according to claim 26 and wherein said conductive substrate comprises:

a non-conductive substrate; and

a conductive layer formed over at least one surface of said non-conductive substrate.

30. A microbattery according to claim 29 and wherein said conductive layer comprises a conductive material electrolessly deposited on said surface of said non-conductive substrate.

31. A microbattery according to claim 29, wherein said conductive layer comprises at least one material selected from the group consisting of Cu, Ni, Co, Fe, Au, Ag, Pd, Pt and their alloys.

32. A microbattery according to claim 26 and also comprising a plurality of cavities formed in said substrate, said cavities having an arbitrary shape and having an aspect ratio greater than 1; and wherein said cathodic layer, said electrolyte layer and said anodic layer are deposited between said cavities and throughout the inner surfaces of said cavities.

33. A microbattery according to claim 32 and wherein said cathodic layer, said electrolyte layer and said anodic layer are continuous.

34. A microbattery according to claim 32, wherein said cavities have an aspect ratio of between 2 to about 50.

35. A microbattery according to claim 32, wherein said cavities have a cylindrical geometry.

36. A microbattery according to claim 26 and wherein said substrate comprises at least one material selected from the group consisting of glass, alumina, semiconductor materials, ceramic materials, organic polymers, inorganic polymers and glass-epoxy composites.

37. A microbattery according to claim 26, wherein said substrate comprises silicon.

38. A microbattery according to claim 26, wherein said cathodic layer

comprises at least one material selected from the group consisting of Cu_2S, MoS_2, Co_xS_y where x = 1-4 and y=1-10, Co_mO_n where m=1-2 and n=1-3, WS_2, and mixtures thereof.

39. A thin film cathode comprising:

a conductive substrate; and

a thin film cathodic layer electrochemically formed on at least one surface of said conductive substrate.

40. A thin film cathode according to claim 39 and wherein said cathodic layer comprises at least one material selected from the group consisting of sulfides of a transition metal, oxides of a transition metal and mixtures of said sulfides and said oxides.

41. A thin film cathode according to claim 39 and wherein said conductive substrate comprises:

a non-conductive substrate; and

a conductive layer formed over at least one surface of said non-conductive substrate.

42. A thin film cathode according to claim 41 and wherein said conductive layer comprises a conductive material electrolessly deposited on said surface of said non-conductive substrate.

43. A thin film cathode according to claim 41 and wherein said conductive layer comprises at least one material selected from the group consisting of Cu, Ni, Co, Fe, Au, Ag, Pd, Pt and their alloys.

44. A thin film cathode according to claim 39 and also comprising a plurality of cavities formed in said substrate, said cavities having an arbitrary shape and having an aspect ratio greater than 1; and wherein said cathodic layer is deposited between said cavities and throughout the inner surfaces of said cavities.

45. A thin film cathode according to claim 44 and wherein said cathodic

layer is continuous.

46. A thin film cathode according to claim 44, wherein said cavities have an aspect ratio of between 2 to about 50.

47. A thin film cathode according to claim 44, wherein said cavities have a cylindrical geometry.

48. A thin film cathode according to claim 39 wherein said substrate comprises at least one material selected from the group consisting of glass, alumina, semiconductor materials, ceramic materials, organic polymers, inorganic polymers and glass-epoxy composites.

49. A thin film cathode according to claim 39, wherein said substrate comprises silicon.

50. A thin film cathode according to claim 39, wherein said cathodic layer comprises at least one material selected from the group consisting of Cu_2S, MoS_2, Co_xS_y where x = 1-4 and y=1-10, Co_mO_n where m=1-2 and n=1-3, WS_2, and mixtures thereof.